Response to Comments
Draft Quality Assurance Project Plan
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

1. The acronym "PSA" for "potential source area" should be added to the acronym list.

Response: The acronym PSA will be added to the acronym list.

2. Worksheet # 12 – Please clarify that the MPC for field and lab duplicates will be measured in RPD, not D as shown on the worksheet.

Response: Worksheet #12 (abbreviations summary sheet) will be modified to indicate that the measurement performance criteria (MPC) for field and laboratory duplicates will be measured in RPD, not D.

3. Worksheet # 12i – If the Soil samples described by this worksheet will be analyzed by the CLP method, it is not understood why they are described as "screening level."

Response: The soil screening samples will be analyzed by a subcontract laboratory utilizing the Contract Laboratory Program (CLP) method. However, the intent of these samples is to compare the fast turnaround volatile organic compound (VOC) laboratory results with the field gas chromatograph (GC) vapor screening results. The soil laboratory results will not be validated and are therefore considered screening results. The following text will be added to the bottom of Worksheet #12i: "Soil sample results analyzed by the subcontract laboratory will not be validated; therefore, the results are considered to be screening level."

4. Worksheet # 17:
   a. The rationale for the number and locations of all planned samples for all matrices should be described.

   Response: The rationale for samples has been added to the appropriate worksheets, as described in the responses below (b through e).

   In addition to items b through e below, the following rationale will be added:
   1) Worksheet 17d, under Wireline Fracture Zone Sampling, after the first sentence: "It is assumed that 6 water entry/exit points will be sampled in each existing well, for a total of 18 samples. The final sampling points will be determined after review of the geophysical logs, in consultation with EPA."
   2) Worksheet 17d, under Wireline Fracture Zone Sampling – Multiport Well Boreholes, after the first sentence: "The final sampling points will be determined after review of the geophysical logs, in consultation with EPA."

b. Page 55 of 115 – The rationale for selecting which three wells to sample for wireline fracture zone sampling should be provided as well as the rationale for taking two samples per well.

Response: The introductory paragraph in Worksheet #17d under the Borehole Geophysics will be modified to read: "CDM Smith will perform an assessment of three existing wells to evaluate their suitability (both conceptually and technically) for geophysical testing and wireline fracture zone sampling to characterize site contamination. These three wells were selected because low levels of chlorinated VOCs have been detected in samples collected (by both EPA and PRASA) in recent years. No other wells in the vicinity have had detections of VOCs. The three wells are listed below."

c. Page 55 of 115 – The rationale for installing three wells on two of the PSAs and two wells at four PSAs as well as for the locations of the wells should be provided.

Response: The first paragraph under Overburden Well Installation on Worksheet #17d (page 55 of 115) will be revised to read: "CDM Smith assumes that 6 of the 10 PSAs that were evaluated (see Worksheet #17e) will require overburden monitoring wells. It is currently assumed that three wells will be installed at two of the PSAs because of their size and location in relationship to the observed VOC contamination in the supply wells and that two wells will be installed at four PSAs because of their smaller size. Wells will be used to determine the direction of groundwater flow and to characterize the site and upgradient conditions. It is currently assumed that a total of 14 overburden wells will be installed. The number of wells may change, based on the results of the PSA investigations (see Worksheet #17e). For example, if no or very limited VOCs are detected as a PSA, then monitoring wells would likely not be needed. Well construction methods and materials (including screen slot size, diameter, and filter pack material) may be modified based on the geology encountered during drilling."

d. Page 57 of 115 – The conditions that may require more than six ports for the multiport wells should be described.

Response: The following text will be added to the end of the first paragraph under the Multiport Monitoring Well Installation heading: "If geophysical and wireline testing in the multiport bedrock boreholes indicates that contamination exceeds potential ARARs in more than six locations within the borehole, CDM Smith will discuss with EPA whether more than six ports will be necessary to adequately monitor the observed contamination."

e. Page 60 of 115 – The rationale for the type of sampling design (judgmental, grid, random) and the process for selecting the one sample to be taken by SUMMA canister should be described. In addition, please check the number of samples for both soil gas and soil screening samples. 20 soil gas samples in 4 PSAs equals 80 samples not 60 as stated.

Response: The following changes will be made to Worksheet 17e:
1) Under Soil Gas Screening, the paragraph will be modified to read: "A total of 5 PSAs will be investigated. At 4 of the PSAs, 10 locations will be advanced and at 1 PSA, 20 locations will be advanced via direct-push technology (DPT), for a total of 60 sampling locations. Sampling locations will be biased to areas with visual observations of likely contamination (e.g., stained soil, exterior pipe discharge locations, interviews with site workers regarding potential discharge locations, etc.). If no obvious areas of contamination are observed or indicated through personnel interviews, at least one soil gas screening sample will be collected on each side of buildings, assuming access can be achieved.

Boreholes will be advanced using DPT to drive stainless steel rods equipped with a detachable stainless steel drive point to eight feet bgs. Once the desired depth is reached, the drive rod will be retracted to expose a 6-inch sampling screen attached to dedicated Teflon tubing used to collect the soil vapor samples. At each boring, one soil gas sample will be collected in Tedlar bags and analyzed via field GC for PCE, TCE, and DCE (for a total of 60 samples). The field GC operations manual is included as Appendix H (in field copies of the QAPP only). One boring at each PSA will be sampled for TCL VOCs (see Worksheet 15g) by collecting a grab sample in a SUMMA canister and submitting it to a local subcontract laboratory for confirmatory analysis. The location for the SUMMA canister will be either judgmental or random. A judgmental location would be a location likely to have elevated soil vapor (e.g., stained soil). If no judgmental locations are observed at a PSA, then the SUMMA canister location will be randomly selected by the FTL.

If the field screening GC results indicate the presence of VOCs, soil screening will be recommended to EPA."

2) Under Soil Screening, the first paragraph will be modified to read: "It is assumed that soil screening samples will be collected at six PSAs. Up to 10 soil borings will be advanced at 5 of the 6 PSAs via DPT. At PRIDCO West, because of its size, 20 soil borings will be advanced, for a total of 70 borings. Boring locations will be based on the results of the soil gas screening at each of the PSAs; the soil screening will be used to determine the extent of soil gas observed during that phase of testing, and to help determine whether definitive-level soil samples for CLP analyses should be collected.

At each boring, four-foot DPT core samples will be collected continuously, starting at the surface and proceeding until refusal or until bedrock is encountered (assumed to be 40 feet). Upon retrieval from the sampler, each four-foot core will be screened for VOCs using a photo-ionization detector (PID). The lithology of each sample will be characterized and logged by the field geologist. "

3) Under Soil Delineation Sampling, the first paragraph will be modified to read: "At each of the six PSAs, six soil borings will be advanced via DPT. The boring locations will be selected based on the results of the soil gas screening and the soil screening activities at each PSA. Soil sample locations will be biased toward the highest results from these two initial sampling events.

At each boring, four-foot DPT core samples will be collected continuously, starting at the surface and proceeding to the water table (assumed to be at 12 feet bgs). Upon retrieval from the sampler, each four-foot core will be screened for VOCs using a PID. The lithology of each sample will be characterized and logged by the field geologist."

5. Worksheet # 18 – The samples ID numbers for each sample should be provided as well as the rationale for each sample location. A range of ID numbers could be used for similar samples.

Response: Worksheet #18 will not be changed in the QAPP. Instead, the attached Table 1 of sample ID numbers and rationale will be added to the QAPP.

6. Worksheet # 31 and 33 – Audits performed by EPA on it laboratories need not be included in this worksheet.

Response: On Worksheet #31, the following assessments will be changed to CDM Smith as the organization performing the assessment: Sample Collection and Documentation and Health and Safety. On Worksheet #33, the following line item will be eliminated: Laboratory Technical Systems/Performance Audits.

Table 1
Summary of Sample Identification Numbers
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Sample Type	Sample Identification	CLP/DESA Analysis											Subcontract Lab			Field	Rationale
		Trace TCL VOC[1]	TCL VOCs (Soil)	Soil Moisture[2]	Chloride	Nitrate/nitrite	Sulfate, Sulfide	TSS, TDS, MEE, TKN	TOC (aqueous)	Alkalinity, Ammonia	Hardness	Soil TOC, GS, pH	TO-15 TCL VOCs[3]	Trace TCL VOCs	TCL VOCs (Soil)	Field GC[4]	
Existing Well Wireline Fracture Zone Sampling (CLP)																	
Ana Maria	GS-01-ANA through GS-06-ANA	6															TBD based on results of geophysical testing
Club de Leones	GS-01-CLUB through GS-06-CLUB	6															TBD based on results of geophysical testing
Terminal de Carros Publicos	GS-01-TCP through GS-06-TCP	6															TBD based on results of geophysical testing
PSA Soil Vapor Screening (Field GC and Summa Canisters/Subcontract Laboratory)																	
PSA 5 (PRIDCO East)	SG-01-PSA5 through SG-10-PSA5												1			10	TBD based on visual observation or random
PSA 6 (PRIDCO West)	SG-01-PSA6 through SG-20-PSA6												1			20	TBD based on visual observation or random
PSA 7 (RETO Plant)	SG-01-PSA7 through SG-10-PSA7												1			10	TBD based on visual observation or random
PSA 8 (Raul Lugo)	SG-01-PSA8 through SG-10-PSA8												1			10	TBD based on visual observation or random
PSA 9 (Unfinished mall)	SG-01-PSA9 through SG-10-PSA9												1			10	TBD based on visual observation or random
PSA Soil Screening (Field GC and Subcontract Laboratory)																	
PSA 1 (Extasy Q Prints)	SBG-01-PSA1-A, -B, -C through SBG-10-PSA1-A, -B, -C														1	30	TBD based on results of soil gas survey
PSA 2 (CRPDC)	SBG-01-PSA2-A, -B, -C through SBG-10-PSA2-A, -B, -C														2	30	TBD based on results of soil gas survey
PSA 3 (DFDC)	SBG-01-PSA3-A, -B, -C through SBG-10-PSA3-A, -B, -C														1	30	TBD based on results of soil gas survey
PSA 4 (Serrano II DC)	SBG-01-PSA4-A, -B, -C through SBG-10-PSA4-A, -B, -C														2	30	TBD based on results of soil gas survey
PSA 5 (PRIDCO East)	SBG-01-PSA5-A, -B, -C through SBG-10-PSA5-A, -B, -C														1	30	TBD based on results of soil gas survey
PSA 6 (PRIDCO West)	SBG-01-PSA6-A, -B, -C through SBG-20-PSA6-A, -B, -C														4	60	TBD based on results of soil gas survey
PSA Groundwater Screening (Field GC and Subcontract Laboratory)																	
PSA 1 (Extasy Q Prints)	SBGS-01-PSA1-A, -B through SBGS-10-PSA1-A, -B													1		20	Sample at top of water table and top of bedrock
PSA 2 (CRPDC)	SBGS-01-PSA2-A, -B through SBGS-10-PSA2-A, -B													1		20	Sample at top of water table and top of bedrock
PSA 3 (DFDC)	SBGS-01-PSA3-A, -B through SBGS-10-PSA3-A, -B													1		20	Sample at top of water table and top of bedrock
PSA 4 (Serrano II DC)	SBGS-01-PSA4-A, -B through SBGS-10-PSA4-A, -B													1		20	Sample at top of water table and top of bedrock
PSA 5 (PRIDCO East)	SBGS-01-PSA5-A, -B through SBGS-10-PSA5-A, -B													1		20	Sample at top of water table and top of bedrock
PSA 6 (PRIDCO West)	SBGS-01-PSA6-A, -B through SBGS-20-PSA6-A, -B													2		40	Sample at top of water table and top of bedrock
PSA Soil Delination Sampling (CLP)																	
PSA 1 (Extasy Q Prints)	SB-01-PSA1-A, -B through SB-06-PSA1-A, -B		12	12								6					TBD based on results of soil gas and soil screening
PSA 2 (CRPDC)	SB-01-PSA2-A, -B through SB-06-PSA2-A, -B		12	12								6					TBD based on results of soil gas and soil screening
PSA 3 (DFDC)	SB-01-PSA3-A, -B through SB-06-PSA3-A, -B		12	12								6					TBD based on results of soil gas and soil screening
PSA 4 (Serrano II DC)	SB-01-PSA4-A, -B through SB-06-PSA4-A, -B		12	12								6					TBD based on results of soil gas and soil screening
PSA 5 (PRIDCO East)	SB-01-PSA5-A, -B through SB-06-PSA5-A, -B		12	12								6					TBD based on results of soil gas and soil screening
PSA 6 (PRIDCO West)	SB-01-PSA6-A, -B through SB-06-PSA6-A, -B		12	12								6					TBD based on results of soil gas and soil screening
Multiport Wireline Sampling (Subcontract Laboratory)																	
Multiport 1	MPW-01-GS-01 through MPW-01-GS-06													6			TBD based on results of geophysical testing
Multiport 2	MPW-02-GS-01 through MPW-02-GS-06													6			TBD based on results of geophysical testing
Multiport 3	MPW-03-GS-01 through MPW-03-GS-06													6			TBD based on results of geophysical testing
Multiport 4	MPW-04-GS-01 through MPW-04-GS-06													6			TBD based on results of geophysical testing
Multiport 5	MPW-05-GS-01 through MPW-05-GS-06													6			TBD based on results of geophysical testing
Well Sampling - Round 1[5] (CLP/DESA)																	
Multiport Wells 01 to 05	MPW-01-P1 through P6-R1 through MPW-05-P1 through P6-R1	30			15	15	15	15	15	15							All wells for VOCs, 20 wells for other parameters
MWs 1 through 14	MW-01-R1 through MW-14-R1	14			5	5	5	5	5	5							All wells for VOCs, 20 wells for other parameters
Drainage Features Sampling (CLP/DESA)																	
Surface Water	SW-1 or 2-PSA1 through SW-1 or 2-PSA4; SW-1, 2 or 3-PSA5 and -PSA6	14									14						TBD based on visual observations at each PSA
Sediment	SE-1 or 2-PSA1 through SE-1 or 2-PSA4; SE-1, 2 or 3-PSA5 and -PSA6		14	14								14					TBD based on visual observations at each PSA

Table 1
Summary of Sample Identification Numbers
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Notes:
[1] SOM01.2
[2] will be part of CLP TCL analysis
[3] 48 hour turn-around time
[4] tetrachloroethene (PCE), trichloroethene (TCE) and dichloroethene (DCE)
[5] Round 1 includes 30 ports and 14 single screen wells.

Abbreviations:
CLP = Contract Laboratory Program
DESA = Division of Environmental Science and Assessment
DO = dissolved oxygen
GC = gas chromatograph
GS = grain size
MEE = methane/ethane/ethene
MS/MSD = matric spike/matrix spike duplicate
ORP = oxidation reduciton potential
PSA = potential source area
SpC = specific conductivity
TBD = to be determined
TCL = Target Compound List
TDS = total dissolved solids
TKN = total Kjeldahl nitrogen
TOC = total organic carbon
TSS = total suspended solids
VOC = volatile organic compound